GEOGRAPHIC NEWS BULLETINS

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THE NATIONAL GEOGRAPHIC SOCIETY

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Photograph by J. Ortiz Echagüe

A GREAT HAND FOR FISHING OR FIGHTING

The Basque fisherman makes his living on the stormy Bay of Biscay off Spain's northeastern coast, and takes his leisure in a tavern. The Basques now have an autonomous government, distinct from the rest of Spain (see Bulletin No. 1).

HOW TEACHERS MAY OBTAIN THE BULLETINS

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Bilbao, Spain's Citadel of the Basques

MOST of the war news out of Spain has described fighting around Madrid, or scattered engagements along the "southern front" near Córdoba and Málaga. But there is also a "northern front"—a thin crescent encircling a section of beautiful seacoast and rugged mountains along the Bay of Biscay.

This tiny spearhead has been a thorn in the side of General Franco's rebel forces since the war began last July. While it has aided the Madrid regime by threatening the rebel rear, it has also set up its own autonomous government, called The Basque Republic, with the port of Bilbao as its capital.

Bilbao is just the opposite to what popular fancy imagines the typical Spanish town to be. The city is energetic, smoky and prosperous. It never hears the word *siesta. Mañana* in Bilbao means "Do it today!" Spanish, anyway, is a secondary language; most Bilbaoans speak Basque—a strange tongue that is said to be absolutely unrelated to any other European language.

"The Pittsburgh of Spain"

While the zooming of war planes, the distant rumble of artillery fire, and the chattering of machine guns in the hills are ominous sounds to Bilbao residents, the city is no stranger to noise. In normal times this "Pittsburgh of Spain" hears the whistling of trains, the raucous sirens of steamers coming up the River Nervion, and the rattle and roar of iron foundries and shipbuilding yards from early morning until late at night.

Like other Spanish towns, too, Bilbao has its flat-toned church bells, its cries of street venders, and its inevitable early morning clatter of blinds and shutters as homes come to life and shops open for business.

But at Bilbao there are two early morning incidents that apparently are unique. One begins when the oil lamps of the *anguleros* are put out. *Anguleros* are fishermen who, since midnight, have been catching *angulas,* or little white, almost transparent worms (perhaps it would be better to call them tiny eels) only two inches long. Tramping home with lamps in hand and long-handled nets over their shoulders, the *anguleros* are a picturesque sight. When a batch of the eels is fried in olive oil and served in an earthenware dish, with the oil still popping as it is brought to the table, gourmets proclaim it to be among the world's delicacies.

This rare titbit inhabits the River Nervion, and is caught along the stone walls of Bilbao's quays, being lured into the nets by the fishermen's oil lamps.

Women Stevedores Unload Coal Boats

Another distinctive feature of Bilbao's civic life is the woman stevedore, whose chatter and cries echo along the waterfront at dawn. Bilbao owes much of its importance as a port to the heavy outward-bound traffic in iron ore from nearby mines and the imports of coal to furnish fuel for many Basque industries.

Modern machinery now handles most of the iron ore, but women workers still unload some of the coal carriers by hand, or, perhaps, to be more explicit, by head. A continuous line of barefooted stevedorettes (to coin a word) move up one gangplank, with bushel basket in hand, and down another to the coal dumps on shore with a heaping basketful of coal balanced on their heads.

When these toilers gather shortly before daybreak to begin work, there is a

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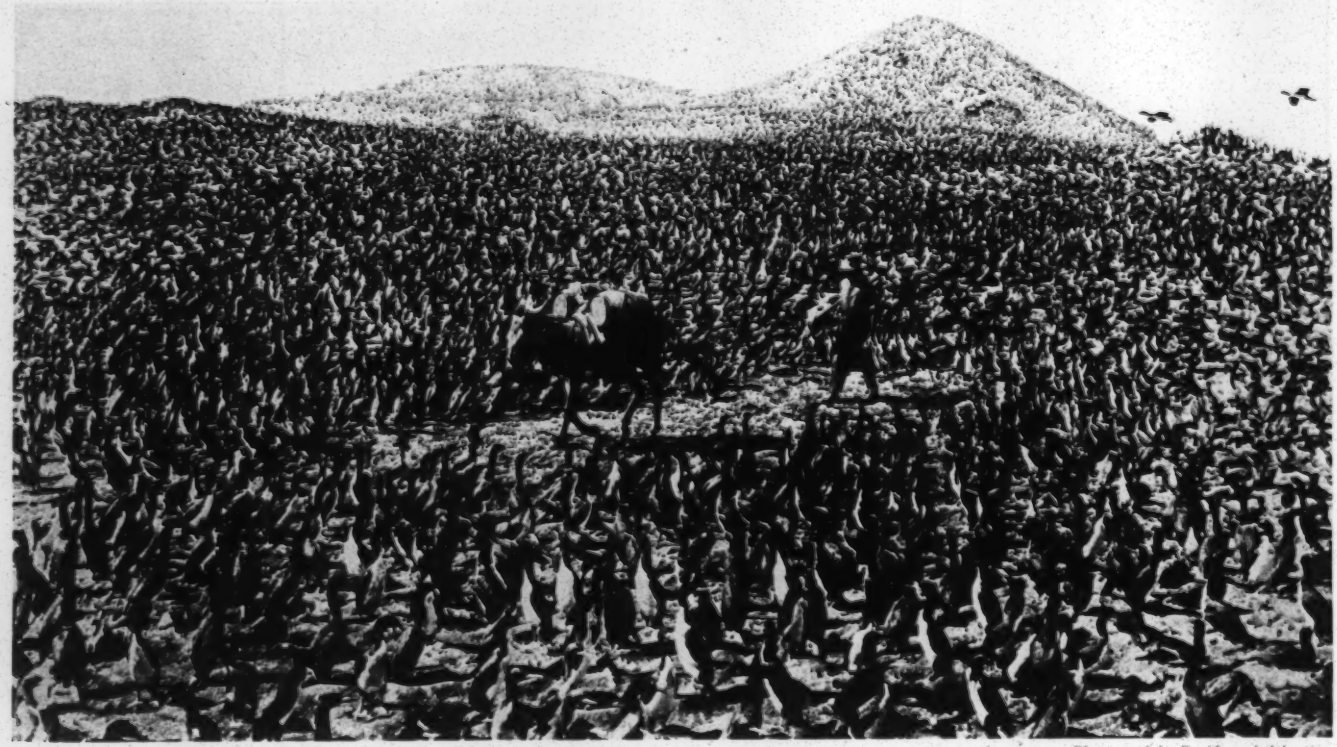

Photograph by Pacific and Atlantic

ANTARCTIC BIRDS THAT LIVE PART OF THE YEAR IN TROPICAL PERU

In the cool waters of the Humboldt Current in the Pacific off Peru's coast, the guanayes from the south polar area seek anchovies and other fishy titbits within a few degrees of the Equator. They have practically taken possession of several Peruvian islets off that country's northern half as nesting grounds, and make way for mere man's passage with fearless dignity. From the islands in the morning the bird colonies send scouting parties to find good fishing grounds; later the rest follow in a steady stream which darkens the air. The guanayes, or Peruvian cormorants, are the basis of Peru's million-dollar guano or fertilizer industry (see Bulletin No. 2).

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The Humboldt Current: A "River" in the Ocean

THE Humboldt Current has gone astray again. Its wandering serves as a reminder that the "pathless sea" is not pathless at all, but has well defined currents varying in direction and temperature. The Humboldt Current's route lies along the Pacific coast of South America.

When a current strays from its usual course, as the Humboldt has done, it brings disaster to vast numbers of fish and sea birds, which find their living conditions completely changed. In the path of the cold Humboldt Current, for instance, no coral polyps live. The western coast of South America, therefore, is free of coral reefs although these formations dot the ocean elsewhere in this same latitude.

"River" of Cold Water in Tropical Ocean

For this current is a mass of cold water about 150 miles wide, flowing through the Pacific northward from the South Polar areas. Cool, moist south and southwesterly winds which blow northward with it are the cause of a strange phenomenon: cool weather in the tropics along the Peruvian shore, and a rainless desert right next to the sea. The recent deviation of the current brings to these coastal deserts the likelihood of unaccustomed rains.

The Humboldt Current is in many ways the reverse of that better known ocean river, the Gulf Stream. It is of polar rather than tropical origin, bringing coolness to Pacific coasts instead of warmth to Atlantic shores. Whereas the Gulf Stream's temperature is about 83 degrees, the other stream is some twenty degrees cooler.

Cool winds from over the Humboldt Current, which keep rain from the desert, are far from being ill winds. By withholding rain, they have made possible one of the richest deposits of natural fertilizer in the world. On rainless islands and peninsulas along the Peruvian coast are found plentiful supplies of bird deposits or guano (manure) extremely valuable as fertilizer. In a rainy region the guano would have been washed away as fast as it was deposited (see illustration, page 2).

In the rainless coastal area cooled by the Humboldt Current, however, it has been possible for these deposits to increase steadily over long periods of time.

Two Currents Meet Off Ecuador

This cold-water ocean stream originates as a branch of the Antarctic Drift, which is another ocean current flowing eastward across the southern Pacific. Branching north, the Humboldt Current carries a stream of cold Antarctic water along the South American coast for 2,000 miles or more.

A further chill is added to the current by cold deep-sea water which wells up from below the surface. The "set" of the current is westward, away from the coast. This pushes the warm surface waters away from the land, permitting the cold water to rise.

Just at the apex of South America's western bulge, the Humboldt Current meets another current which flows southward from the Equator. Sometimes known as *El Niño,* "The Baby," this is six to eight degrees warmer than the Humboldt. Usually the two meet just off Ecuador and flow westward toward the Galapagos Islands (see map, next page).

But sometimes the currents go astray from their regular routes. Then the Humboldt temporarily moves farther westward, and *El Niño* increases in strength and flows much farther south than usual. The invasion of warm water kills off

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great row and ado about preferred places in the line, some gangplanks being slightly nearer to the coal heaps than others.

The iron deposits which are the source of most of Bilbao's wealth lie back in the hills. Most of them are worked with British capital. The old English words *bilbo,* for cutlass, and *bilboes,* for iron fetters, indicate that the town has long had trade relations with its neighbor to the north. In addition to its mining and metallurgic industries the city also exports wine, flour, paper, glass, and hides. Bilbao lies eight miles up the River Nervion from the open sea, but its quays can be reached by ocean steamers.

Note: Other scenes and descriptions of the Basque country and its people will be found in "Turbulent Spain," *National Geographic Magazine,* October, 1936; "Flashing Fashions of Old Spain" (Duotone Insert), March, 1936; and "The Land of the Basques," January, 1922.

Bulletin No. 1, April 26, 1937.

NOTE TO TEACHERS

Two more editions of the GEOGRAPHIC NEWS BULLETINS will be published before the end of the spring term. Teachers subscribing last October, who wish to be certain that there will be no break in their subscriptions upon the opening of school next fall, may send in their annual subscription fee of 25 cents now. Because the BULLETINS represent a substantial contribution from the educational funds of The Society, it is not possible to send several renewal notices. Teachers whose subscriptions started later than October, 1936, will receive the BULLETINS for a full year (30 issues) from the date of subscription.

Photograph by Angel Rubio

KEEPING THE FISH BUSINESS, BUT NOT THE FISH, IN THE FAMILY

In many cases a fisherman's catch is turned over immediately to his wife, and she carries it in a basket on her head through the streets, hawking her fresh wares noisily. This Bilbao business woman waits for customers to "bite," her sidewalk table "baited" with fine big bonito, as the sign on the left indicates. Bystanders are as eager to get into the picture with the fish as if they had caught them.

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"Battle of the Crater" To Be Re-enacted at Petersburg

ONE of the most dramatic episodes of the Civil War will be recalled on April 30 when U. S. Marines, Virginia Military Institute cadets and the National Guard of Virginia re-enact the famous "Battle of the Crater" on the site of the original engagement near Petersburg, Virginia.

The "Battle of the Crater" was part of one of the final campaigns of the Civil War, the "crater" being formed by the explosion of a great quantity of blasting powder under the Confederate lines. Because of faulty Federal plans and a prompt counter attack by the Southern troops, the effort failed; but the terrific blast left a hole in the ground that is still plainly visible. The crater, two miles southeast of Petersburg on U. S. Route 460, is now a feature of the new Petersburg National Military Park.

Crater Proved Obstacle Instead of Aid

Troops from twenty or more States took part in the original battle on July 30, 1864, although South Carolina troops suffered the severest casualties because they were in part of the line where the tremendous explosion took place. It was Grant's purpose to make a breach in the Confederate trenches, capture Petersburg, and thereby force the Confederates to give up their capital, Richmond.

To make a gap in the line the 48th Pennsylvania Volunteers dug a tunnel more than 500 feet long. Most of the men on this dangerous detail were former coal miners, so the secret passageway was scooped out in a little over a month. Meanwhile the Southerners became aware of what was going on and attempted to dig down and intercept the tunnelers. But they did not locate the mine, which was hurried to completion by running off two lateral tunnels under the Confederate trenches and filling them with 8,000 pounds of blasting powder.

"Zero hour" was set for 3:30 a. m. July 30, and the long fuse was touched off. But, while the Union troops crouched in the darkness, awaiting the blast as a signal to charge, nothing happened. The tension must have been terrific until two volunteers crawled into the tunnel and discovered that the fuse had gone out at a splice. It was relighted and, at 4:45 a. m., the mine went off with a roar that shook the windows of every house in Petersburg and hurled tons of earth, men, horses, guns, carriages, and debris far into the air.

Battlefield Became Golf Course

The steady rain of rocks and dirt that fell on the backs of the waiting Union troops delayed them for several minutes. When they moved forward, they found the enormous crater made by the explosion was an obstacle rather than a means of getting through the Confederate fortifications. It was 200 feet long, 50 feet wide, and more than 25 feet deep.

Meanwhile the Southerners rallied in a counter attack, and the men in the huge pit were caught in a murderous cross fire. In all, the Federal army lost 4,000 men in the fiasco, while the Confederate loss was not more than 1,500. It was not until eight months later, on April 2, 1865, that Grant was able to take Petersburg, and Lee was forced to retire to Appomattox where he surrendered, ending the war.

In recent years the crater battlefield was used as a golf course, and many of the old entrenchments were "hazards" that called for frequent use of mashie-

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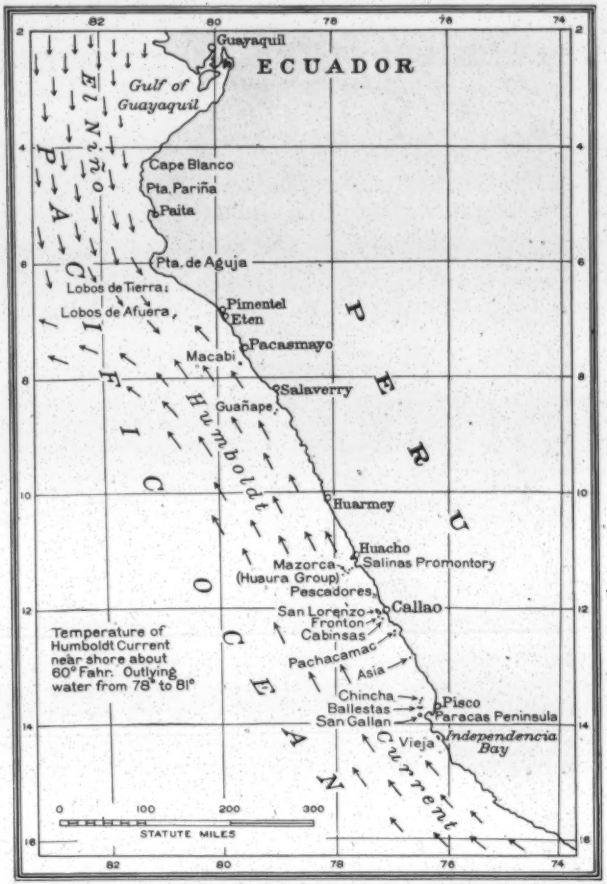
vast numbers of fish which are accustomed to the cooler Humboldt waters, and the birds that feed upon them either die of starvation or are poisoned by eating partially decomposed fish.

This year, for the first time since 1925, the currents seem to have wandered off their courses again, and the fish and birds are suffering from the result. It is also only at the rare times when the currents go wandering that rain of any amount falls in the Peruvian coastal desert. Warm moisture-laden winds, accompanying the *El Niño* current southward, bring unaccustomed showers to regions almost entirely without rain for years.

Note: Descriptions of the Humboldt Current and of the coast of Peru off which it flows can be found in "Flying the World's Longest Air-Mail Route," *National Geographic Magazine*, March, 1930; "The Most Valuable Bird in the World," September, 1924; and "Peru's Wealth-Producing Birds," June, 1920.

Bulletin No. 2, April 26, 1937.



Drawn by A. H. Bumstead

PERU'S LARGEST "RIVER" FLOWS OFF ITS SHORES IN THE PACIFIC

The Humboldt Current, running northward from the Antarctic to meet a warmer current, *El Nino*, brings to Peru's coast and the adjacent islands in normal times a cool, rainless climate, free of storms. The Equator is about six degrees above the chilly current's northern limits.

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Belgium Keeps an Eye on the Belgian Congo

NYAMLAGIRA, volcano in east central Belgian Congo, is reported smoldering. The rest of the world looks on with interest, for volcanoes are not usually associated with this land of jungles, pygmies, and untold mineral wealth.

No volcanic upheaval is necessary to attract the attention of Belgium. The tiny mother country is linked by strong commercial ties with her vast black African colony, nearly eighty times larger. Belgium holds a national festival each July to commemorate the founding in 1885 of the Congo Free State, which was annexed 23 years later as the Belgian Congo. A museum near Brussels is devoted to the products which pour into the European country from her African outpost. Among the exhibits are samples of minerals which form two-thirds of the territory's wealth.

Over twenty thousand square miles in the present colony's northeast section formerly belonged to Germany. The cattle-rich Ruanda and Urundi districts, once parts of adjoining German East Africa (now Tanganyika), were ceded to Belgium as mandates of the League of Nations after the World War.

One of Two Chief Sources of Radium

The Belgian Congo is one of the two chief sources of radium. It also produces gold, copper, tin, and diamonds. These, together with palm nuts, palm oil, cotton, copal gum (used in varnishes), and coffee, form the chief exports. The coffee is shipped, duty free, into Belgium, where it is almost a national drink.

Much of the Belgian Congo's 918,000 square miles of area is covered with steaming tropical forests and open savannas where elephants, gorillas, and other African animals roam. There are also great stretches of land where agriculture flourishes. Because of the little effort required, raising palm trees and the production of palm-oil are popular with the natives. Coffee is cultivated chiefly by Europeans.

The region has a population of about 9,000,000 black natives and only about 18,000 white people. In 1935 nearly 12,000 of the latter were Belgians; only 32 were Germans. Europeans have been discouraged from settling by the country's hot, moist climate, with its two wet seasons, and by the malaria and sleeping sickness which often attack residents of the lowlands.

Congo River Is Colony's Trade Artery

Give the map of Africa a quarter turn to the left and the shape of the Belgian Congo will very roughly resemble that of the United States with parts of Mexico attached. In place of the boundary formed by the American Great Lakes, the chain made up of Lakes Albert, Edward, Kivu, Tanganyika, and Mweru forms much of the boundary at the top, separating the Belgian Congo on the east from Uganda, Tanganyika, and Northern Rhodesia.

On the west, the colony tapers, like Mexico, to a narrow strip of land, through which the Congo River flows into the Atlantic. This twenty-five-mile stretch of seacoast is the vast territory's only door to the ocean.

A weekly air service links Brussels with Léopoldville, the Belgian Congo's capital, 5,173 miles away. Those who come to the colony by boat instead of by airplane find it a nineteen-day journey from Antwerp to Matadi, the chief port of entry, located on the Congo River, about 90 miles inland.

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niblicks. Now the area has been taken over by the National Park Service, as a part of the larger Petersburg National Military Park. The golf clubhouse, near the crater, serves as a museum where many relics—rifles, shells, "Minié balls," buttons—are preserved, along with maps and sketches showing details of the Petersburg campaign.

Nearby Was Camp Lee of World War Fame

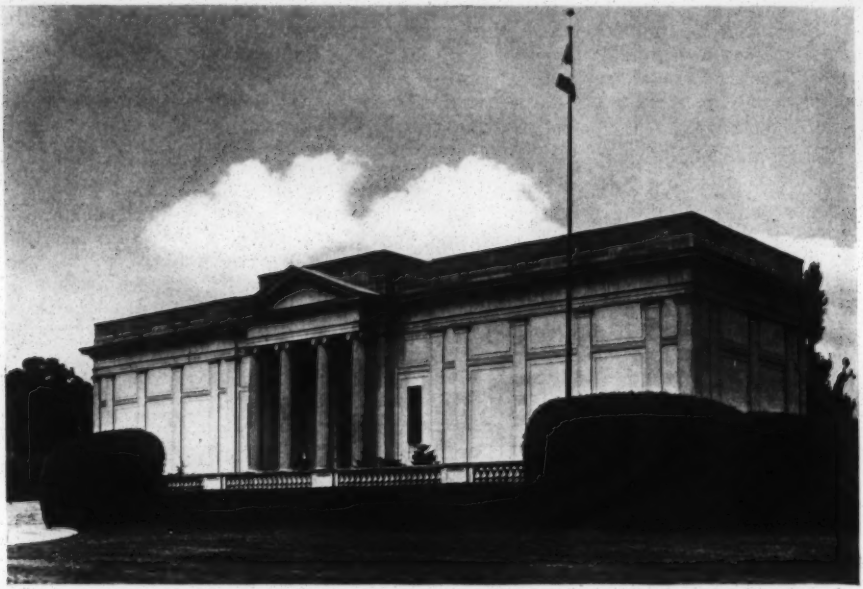
The crater itself is remarkably well preserved. Where havoc reigned 73 years ago, green grass now grows in a bowl-shaped depression about 20 feet deep. Tall shade trees have grown around the rim of the hole. A part of the old tunnel still shows, and its course can be traced across the fields in the direction of the Union lines by numerous cave-ins.

In the forthcoming sham battle wooden revetments will be used in place of breastworks.

The region is familiar to thousands of World War veterans, who trained at nearby Camp Lee, which today is a "ghost city" with less to show for its feverish wartime activity than many places associated with the Civil War. The Petersburg area also figured in an even earlier conflict when a British force under General William Philips and Benedict Arnold defeated American militia under General von Steuben here on April 25, 1781. Later the British were driven out by Lafayette.

Note: Scenes of Civil War strife in nearby regions are described in the following: "Dismal Swamp in Legend and History," *National Geographic Magazine*, July, 1932; "Most Famous Battlefield in America" (Gettysburg), July, 1931; "Virginia—A Commonwealth That Has Come Back," April, 1929; "Fame's Eternal Camping Ground," November, 1928; and "Maryland Pilgrimage," February, 1927.

Bulletin No. 3, April 26, 1937.



Photograph by Charles Martin

FROM "CRATER" CONFUSION TO BATTLE ABBEY CALM IN RICHMOND

In the former Confederate capital, which the Federal Army finally captured after the long Petersburg campaign of 1864-65, students of American history can see battle murals, and portraits of southern soldiers and statesmen, or may consult books describing the great conflict between the States. The classic sandstone building of the Confederate Memorial Institute (also known as Battle Abbey) has only two windows, one at each side of the huge bronze doors.

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Clock Ticks Heard Around the World: U. S. Navy Time Signals

CAESAR had his water clock, Charles the First his thick oval "biscuit" watch, and George III his chiming mantel clock, although that American "alarm-clock" Paul Revere was more helpful in keeping him up with the times. But more accurate time than royalty used to have is available today to the world at large through the time signals of the Naval Observatory in Washington, D. C.

It is to safeguard the split-second accuracy of Observatory time that Capt. J. F. Hellweg, Observatory superintendent, will cooperate with the National Geographic Society in the expedition to the Phoenix Islands to observe the sun's eclipse on June 8. By being checked with movements of the sun and stars, Observatory time is determined to the thousandth of a second.

From a Faceless Clock Buried 12 Feet Deep

In fact, the Naval Observatory maintains the most accurate time-measuring apparatus in the world. Allowing for weather conditions, contrariness of radio and electricity, and possible mechanical faults, its signals tell the hour within forty-nine ten-thousandths of a second. Julius Caesar couldn't measure a year, a time unit 31 million times as large, as exactly as that; by 46 B.C. the year had come to be 90 days off. The Emperor had to import an astronomer from Egypt to set the calendar back three months and make it keep in step with the sun.

In Observatory Circle, a green hill of 84 acres surrounded by embassies, apartment houses, and residences of northwest Washington, with the Zoo and the Cathedral for neighbors, the world's prize time-splitting takes place. The second is shattered into time-atoms so tiny and new that they have not yet a distinctive name. Some of the apparatus has been patented within the past two months.

Apparently simple is the mechanism, distributed through the three small rooms. In one, an underground chamber, a master clock of high precision ticks undisturbed. In another stands the instrument for checking the clock's accuracy nightly with the stars—a photographic zenith tube, a recently developed specialty of the Observatory. In the third and largest room, the transmitting clock, under the control of the master timepiece, sends automatic signals to all connections on a switchboard, one of which is the Navy's radio station at Arlington (see illustration, next page). Quite involved, however, are the precautions by which superhuman exactness in clocks, signals, and checking is attained.

Sealed Vault Viewed Through Reversed Periscope

Ultimate source of the world-wide commotion of time signals is the small vault twelve feet below the earth's surface at the central and highest point of the Observatory hill. Within stands the master clock, a complex glass-enclosed faceless mechanism of English make. By electricity it controls a slave clock upstairs, causing remote hands to make visible the workings of its distant cogs and springs.

The clock chamber is really a vault within a vault, being insulated by a wide air passage between double walls. Over it, too, thermostats stand guard, keeping its temperature constant at 82 degrees. In addition to the acting master clock, it contains two extra British clocks and two German timepieces, the latter with faces. All of them self-winding and wired from outside batteries, they are ready to substitute at a moment's notice in case the master should fail to function. They are so arranged that the pendulum motion of each cannot affect the others. To

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Past the smaller ports of Banana and Boma, passenger steamers usually proceed to Matadi, shut off from winds and sweltering on its steep, rocky river bank. Pilots are needed in the rainy season because of the swift current which constantly shifts channels, washes away buoys, and even carries along dangerous "floating islands" of earth and roots which bear vegetation, occasionally even palm trees. Crocodiles and hippopotamuses are common.

Railroad Encircles Series of Rapids

Between Matadi and Léopoldville, more than 250 miles farther up, the Congo is interrupted by rapids. Travelers disembark at Matadi and cover the remaining distance to the capital by train. Beyond Léopoldville, steamers run for more than 1,000 miles to Stanley Falls, and above the falls, more than 500 miles up the section of the Congo called the Lualaba. It was the noted explorer, Sir Henry Morton Stanley, who proved that the Lualaba and the Congo Rivers were the same.

Note: Additional Congo material will be found in "Nature's Most Amazing Mammal" (Elephant), *National Geographic Magazine*, June, 1934; "Through the Deserts and Jungles of Africa by Motor," June, 1926; "Cairo to Cape Town, Overland," February, 1925; "Geography and Some Explorers," March, 1924; and "Transporting a Navy Through Jungles of Africa," October, 1922.

See also in the GEOGRAPHIC NEWS BULLETINS: "The Congo, Belgium's Storehouse of Riches," week of April 8, 1935.

The Society's New Map of Africa was published as a supplement to the June, 1935, issue of *The Magazine*. Additional copies can be had from The Society's headquarters for 50 cents (paper edition), and 75 cents (linen edition) postpaid.

Bulletin No. 4, April 26, 1937.

Photograph by Rene A. M. Van Crombrugge

RIVERS HAVE LONG BEEN THE CONGO'S ARTERIES OF TRADE

In this region of heavy rainfall most of the commerce moves to the sea down the mighty Congo and its tributaries. Recently, however, the Belgian government has linked many of the streams with motor highways, some of which are passable at all seasons of the year. Here native dugout canoes await the arrival of a steamer, to trade acacia gum, gathered in the forests, for knives, and other manufactured goods.

avoid disturbing them, their sealed cases are entered only for a cleaning every few years.

This underground "holy of holies" can be viewed from the room above through a periscope, taken from a dismantled submarine and mounted upside down in the floor. Just above the "steering wheel" on the periscope's black cylinder, which turns the eyepiece to inspect every part of the vault below, is a small spring button controlling an electric light in the clock chamber. Since that light, if kept on long enough, raises the vault's temperature a fraction of a degree, a red light near the periscope flashes an automatic warning. Beside the red light is the only other instrument in the periscope room—a large wall slave clock electrically controlled by the works of the master clock below. Other clocks are found throughout the Observatory, synchronized through a relay board with the slave-driver timepiece in the air-locked vault.

Since a clock leading such a sheltered life might grow ruggedly independent and tell time according to its own notions, instead of according to the sun and stars, it is checked nightly. In a separate building stands a photographic zenith tube, a vertical cylinder pointing rigidly upwards to the zenith through a starry slit in the dark room's roof. Since it is known at what instant a given star will pass immediately overhead, the star is photographed through the zenith tube, recording the star's passage and the time according to one of the centrally controlled slave clocks. Then the difference, if any, between star time and clock time is instantly apparent.

Note: See also "Washington Through the Years," *National Geographic Magazine*, November, 1931.

Bulletin No. 5, April 26, 1937.

Photograph by Capt. Albert W. Stevens

TOWERS THAT FLASH THE TIME TWENTY TIMES A DAY

From the towers of the Naval Radio Station at Arlington, Virginia, come the familiar "yeep, yeep, yeep" time signals sent from the Observatory across the Potomac in Washington, D. C. The signals are broadcast 20 times daily, being omitted at the ninth and eleventh hours of both day and night because of congestion on the air waves. The same signals are sent from Annapolis and San Francisco, and are re-broadcast from Honolulu, and Balboa, C.Z. The signals consist of one "yeep" per second for the last five minutes of each hour, always omitting the 29th and 59th to emphasize half-minute and minute intervals, and preserving a whole minute of silence before the final long "yeeeeep" announcing the hour. These signals are relayed over the country for periodic checkup of telegraphic time.

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